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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,078	10/17/2003	P. Bryant Chase	FSUN-001/01US	8210
7590 06/20/2005			EXAMINER	
Cooley Godward LLP ATTN: Patent Group Five Palo Alto Square 3000 El Camino Real Palo Alto, CA 94306-2155			KOSSON, ROSANNE	
			ART UNIT	PAPER NUMBER
			1651	
DATE MAILED: 06/20/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/688,078

Applicant(s)

CHASE ET AL.

Examiner

Rosanne Kosson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38,69-73 and 81-93 is/are pending in the application.
- 4a) Of the above claim(s) 1,22-38,69-73,83-85 and 90-93 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-21,81 and 82 is/are allowed.
- 6) ☒ Claim(s) 86-89 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/22/05.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

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DETAILED ACTION

The amendment filed on May 23, 2005 has been received and entered. Claims 1-7, 12-18, 21, 22, 26, 29, 30, 32-34, 37, 38, 69-73 and 81 have been amended. Claims 8-11 have been canceled, and claims 82-93 have been added. Claims 1, 22-38, 69-73, 83-85 and 90-93 have been withdrawn from prosecution as being drawn to a non-elected invention. Before being amended, claims 22-38 had been withdrawn as being drawn to a non-elected invention.

Accordingly, claims 2-21, 81, 82 and 86-89 are examined on the merits herewith.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

As noted above, claims 1, 22-38, 69-73, 83-85 and 90-93 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim that links the inventions of Groups I and II. As discussed in the restriction requirement Office action, Group II is drawn to an actuator having a movable member that is coated with a biocompatible molecule and myosin and that comprises an energy-transmitting stripe associated with a second biological material, an actin array, to energize it. As amended, claims 1 and 69 and their dependent claims read on the invention of Group II. As a result, claims 1 and 69-73 are constructively non-elected. New claims 83-85 depend from claim 69.

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New claims 90-93 are drawn to the invention of Group II. Therefore, these claims have been withdrawn.

Allowable Subject Matter

Claims 2-21, 81 and 82 allowed, as the subject matter of these claims is not reasonably taught or suggested by the prior art.

Claim Rejections - 35 USC § 103

Claims 86-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider et al. (WO 01/09181) in view of Thomas et al. (J Phys D: Appl Phys 31:253-266, 1998).

Schneider et al. disclose an actuator (molecular motor) comprising movable arrays of first and second proteins, each attached to a movable member, that interact to move a driven member. The driven member may be a shaft or gear to convert the movement of the actuator into useful power that can produce work. The first and second proteins are the muscle proteins myosin and actin. The actuator also comprises a reservoir that has at least two orifices, with one orifice positioned at each end of the movable member, the movable member having opposite ends. The orifices at the ends are positioned to release an energy source, ATP, around the ends of the movable member, to transmit energy to the proteins for their activation (see Figure 8). An array of one of the proteins is coated on a first curved surface, and an array of the other protein is coated on a second, complementary curved surface, such that the two motor

proteins interact to move the second surface in a predetermined direction relative to the first surface. The actuator may also comprise multiple nested layers of complementary first and second protein arrays (see p. 4, line 26, to p. 5, line 29, and p. 7, lines 4-14). The multiple sets of complementary arrays may be attached to multiple, concentric cylinders or cones, and the multiple cylinders placed in a housing, such that the housing containing the cylinders has a pair of opposite orifices to receive the movable members (see Fig. 7B). Schneider et al. do not disclose an actuator in which a movable member moves substantially linearly or in which a movable member is a rod. Schneider et al. also does not disclose all the dimensions of the movable members.

Thomas et al. disclose actomyosin molecular motors in which interdigitating filaments of myosin and actin slide along each other in a substantially linear direction to produce a power stroke in one direction and a recovery stroke in the opposite direction. When the myosin is fixed to a planar substrate, the actin filaments move back and forth in a complementary plane relative to the myosin filaments in the power stroke and recovery stroke (see p. 254 and p. 255, 1st paragraph and Fig. 3). The molecular motor may also be visualized as an arrangement in which rods of myosin (thick filaments) move back and forth relative to an actin surface (see p. 257, right column). As a result, one of ordinary skill in the art would have been motivated to have modified the actuator of Schneider et al., containing myosin- and actin-coated surfaces with relative rotary motion, with the teachings of Thomas et al. to produce an actuator containing myosin- and actin-coated surfaces that move relatively linearly to each other, back and forth, because Thomas et al. teach that this motion is a natural one that produces a power

stroke with each forward movement. The skilled artisan would have recognized that this movement in the direction of the power stroke, longitudinal movement, would have been harnessed in an actuator to move or control other parts. The artisan of ordinary skill would also have recognized that arrays of myosin and actin would have been arranged on the parts of the actuator parallel to the longitudinal axis to produce longitudinal movement. By so arranging the myosin and actin filaments, cylindrical surfaces coated with myosin and/or actin would have had rod-like shapes.

Regarding the dimensions of the rod (claim 88), Schneider et al. disclose that the outer cylinder may have a diameter of 40 microns and the inner cylinder may have a diameter of 20 microns, although the length of the cylinders is not specified (see p. 16, lines 4-8). But, the two cylinders move relative to each other along the surface between the two cylinders, as this surface is where the two types of proteins, myosin and actin, are attached to each other. With cylinder diameters of 20 and 40 microns, this surface has a length on the order of 100 microns. Thus, the actuator of Schneider et al. is of the same scale as the claimed actuator. The exact dimensions, however, are result-effective parameters which were well known in the art at the time of Applicants' invention to be routinely optimized by one of ordinary skill in the art of micromachined biomechanical devices. Thus, the claimed variations in Applicants' device with respect to these dimensions clearly would have been obvious at the time of Applicants' invention, the optimization of these parameters being well within the capabilities of the artisan of ordinary skill at the time of Applicants' invention. Further, where the dimensions are not specified, even if the actuator of Schneider has slightly dimensions

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than the claimed device, the claimed device would not perform differently than the prior art device, in the sense that myosin and actin interact with each other and slide the same way, moving the pieces that they are attached to relative to each other to drive other parts.

Therefore, a holding of obviousness is required.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosanne Kosson whose telephone number is 571-272-2923. The examiner can normally be reached on Monday-Friday, 8:30-6:00, with alternate Mondays off.

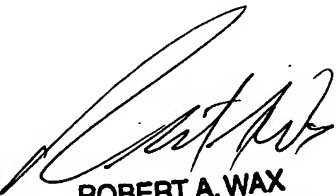
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rosanne Kosson
Examiner
Art Unit 1651

rk/2005-05-26


ROBERT A. WAX
PRIMARY EXAMINER
Art Unit 1653